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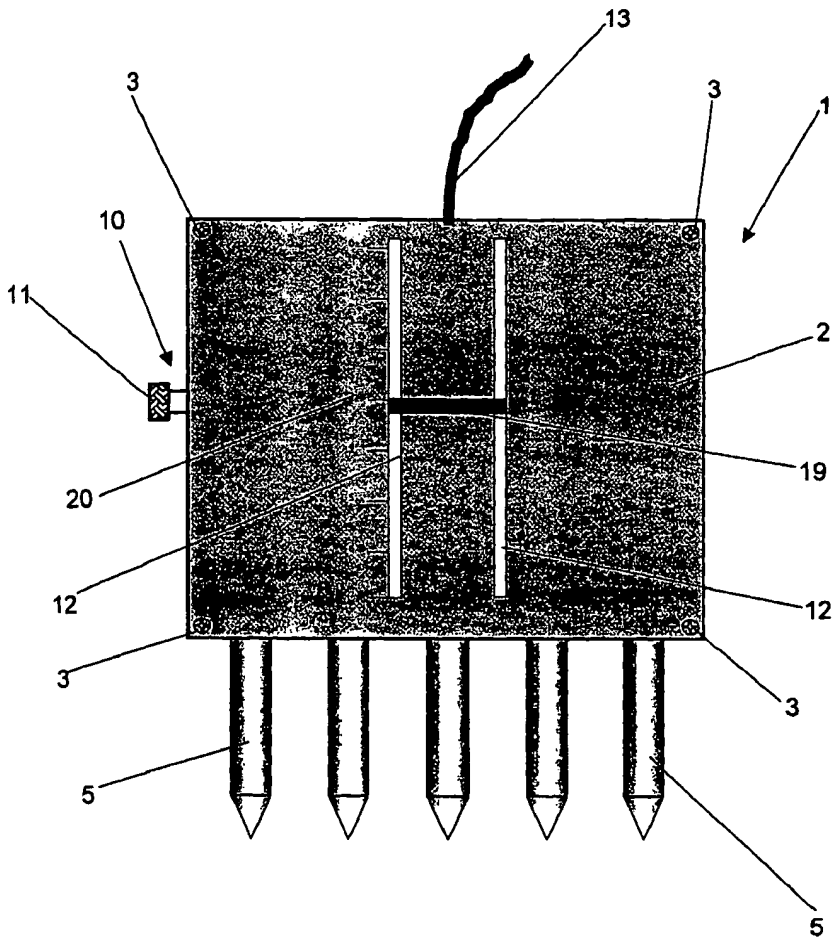

(57) Abstract: An apparatus for treating organic tissue (16) to be subjected to surgical resection comprises a body (1) with which the resection means (5) of said organic tissue (16) is associated, said resection means comprising a plurality of resection elements (5) arranged in an aligned configuration.

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ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

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Apparatus for treating organic tissues

This invention concerns an apparatus for treating organic tissues such as, for example, hepatic tissue, prostatic tissue, pulmonary tissue, etc. that are to be subjected to both intraoperating and laparoscopic surgical resection.

From prior art, different types of surgical instruments are known for the resection of tissues, such as, for example, metal scalpels, electric scalpels, electric scalpels powered by radio frequency, laser scalpels.

All these instruments require the operation of resection of the tissue to be periodically interrupted to enable coagulation in the resection zone in order to stop bleeding in said zone. With electric scalpels, the function of coagulation and the function of resection can be carried out by the same apparatus by varying the power supply to the apparatus and anyway alternating the two functions.

The need to alternate resection with coagulation of the blood inevitably lengthens the duration of the operation and increases the risk of blood entering the cavity.

The aim of this invention is to provide an apparatus for treating organic tissues to be subjected to both intraoperating and laparoscopic surgical resection that enables maximum flexibility of use, and, in particular, enables all the zone affected by the resection to be covered, whatever its form and/or location.

According to a first aspect of this invention an apparatus is provided for treating organic tissue to be subjected to surgical resection, comprising a body with which treatment means of said organic tissue is associated, characterised in that said treatment means comprises a plurality of treating elements arranged in an aligned configuration.

The treating elements may consist of electrode needles supplied with radio frequency electric power, by appropriate electrical supply means.

The use of a plurality of electrode needles that can be inserted along a resection line in the area of organic tissue in which the resection has to be carried out makes it possible, when the needles are powered by electric power means with a radio frequency voltage, to cause the necrotisation of the organic tissue along said resection line and the cauterisation of the blood vessels along said resection line, thereby making the resection operation much more rapid and eliminating the risk of blood entering the cavity.

According to a further aspect of this invention, the treatment means comprises a plurality of hollow needle means, arranged in an aligned configuration, a laser optic fibre being arranged inside each hollow needle means, each laser optic fibre being supplied by an appropriate supply means.

Also in this case the aligned arrangement of the needle elements with the laser optic fibre inside simultaneously enables necrotisation of the organic tissue and cauterisation of the blood vessels along the resection line identified by the aligned needles.

In order that the invention may be clearly and completely disclosed, reference will now be made, by way of examples that do not limit the scope of the invention, to the accompanying drawings, wherein:

Fig. 1 is a front view of an apparatus according to the invention, in a non-operational configuration;

Fig. 2 is a view like the one in Fig. 1, partially sectioned;

Fig. 3 is a view like the one in Fig. 2, with the apparatus according to the invention in an operational configuration;

Fig. 4 is a cross-section of the apparatus in Fig. 1;

Fig. 5 is a view of a portion of organic tissue subjected to treatment with an apparatus according to the invention;

Fig. 6 is a view like the one in Fig. 3, showing a variation of the apparatus according to the invention;

Fig. 7 is a view like the one in Fig. 3, showing a further variation of the apparatus according to the invention.

The apparatus according to the invention shown in Figs. 1 to 3 comprises a body 1 that is substantially box-shaped, provided with a removable front wall 2 that is fixed to the body 1 by, for example, screws 3. Inside the body 1 (Fig. 2) a support plate 4 is housed that supports a plurality of needle elements 5, each one of which has an end 6 fixed in a removable manner to the support plate 4, for example with a Luer connection. The support plate 4 is provided, at its opposite ends, with a slide means 7, coupled in a sliding manner with relative slide guides 8 fixed the side walls 9 of the body 1. To one of the slide means 7 a manoeuvring element 10 is connected, which protrudes outside the body 1, with a knob-shaped element 11 that is used to control shifts in a vertical direction of the support plate 4 to vary the length of the portion of each needle 5 that protrudes from the bottom of the body 1. The manoeuvring element 10 is also used to lock the support plate 4 after said support plate 4 has been positioned in the required position, the slide 7 being connected to the respective slide guide 8 by means of rotation of the knob 11.

An indicator means 19 is further connected to the slide 7, the indicator means 19 emerging from a pair vertical slits 12 made in the body 1 of the apparatus, to which a graded scale 20 is associated, which, for example, indicates by how much the needle elements 5 protrude from the body 1.

In a first embodiment of the invention, each needle element 5 consists of electrode needle in a conductive material, the top end of which 6 is connected by a supply connector 13 and a conductor of electricity 24 to a source of electrical energy that supplies all the electrode needles 5 with radio frequency voltage, for example at a frequency of several hundred KHz,

preferably about 460 KHz. Each needle element 5 can be provided with a cooling means to increase the area of necrotisation along the resection lines.

In a variation of the invention, the needle elements 5 are constituted by hollow needles within each of which an optic fibre is arranged via which a beam of laser light can be sent to the needle 5, which beam of laser light emerges from the end of the optic fibre arranged at the tip 14 of the hollow needle 5.

In a first version of the invention shown in Figs. 1 to 4, the needle elements 5 are of essentially the same length and the support plate 4 has an essentially uniform height, in such a manner that when the needle elements 5 are fixed to the support plate 4, their tips 14 are substantially aligned along a line that is substantially parallel to one side 23 of the body 1.

Fig. 6 shows a variation of the first version of the apparatus shown in Figs. 1 to 4, wherein needle elements 5a of differing lengths are provided that have been chosen to fix the needle elements 5a to the support plate 4, their tips 14 being substantially aligned along a line that is not parallel to said side 23 of the body 1. Said line along which the tips 14 are aligned may be a straight line, but also a curved line.

Obviously, an apparatus according to said first version of the invention can be provided with two series of needle elements: a first series of needle elements 5, to create resections in tissues with a substantially constant depth and a second series of needle elements 5a, to create resections in tissues with a depth that increases or decreases along the selected resection line.

The needle elements 5 and 5a of the first and the second versions of the apparatus are interchangeable. In this way an apparatus according to the invention can be provided with both series of needle elements 5, 5a.

Replacing a series of needle elements 5, 5a, with the other series of needle elements 5, 5a, is simple and rapid to achieve thanks to the "Luer lock" connections between the needle elements 5, 5a and the support plate 4.

Fig. 7 shows a second version of an apparatus according to the invention, wherein the support plate 4a has a height that varies in a substantially linear manner. In this way, by fixing a series of needle elements 5 of the same length to the support plate 4a the relative tips 14 are aligned along a straight line that is tilted in relation to the side 23 of the body 1. On the other hand, if a series of needle elements 5 of differing lengths is fitted to the support plate 4a the tips 14 can be aligned along a line that is parallel to the side 23 of the body 1, or along a curved line.

An apparatus according to the invention can be provided with just one series of needle elements 5, or 5a, and with two interchangeable support plates 4 and 4a, in such a way as to be able to obtain all the alignments of the tips 14 of the needle elements described above by simple replacement of the support plate 4 with the support plate 4a, or vice versa.

To carry out a resection of organic tissue, for example to remove tumour metastasis 15 from hepatic tissue 16 (see Fig. 5), the needle elements 5, 5a are positioned along a first resection line 17 and are inserted into the tissue 16, whilst the electrode needles or the optic fibres are simultaneously supplied with electric power. The needles are positioned beforehand by moving the support element 4, 4a in such a manner that they protrude from the body 1 of the apparatus by a sufficient amount to penetrate the entire depth of the tissue 16, along the entire resection line 17. If the needle elements 5, 5a consist of electrode needles supplied by radio frequency, when they come into contact with the tissue 16, inside the body tissue, between the tip 14 of each needle and the tips of the adjacent needles, radio frequency currents are

established which cause progressive necrotisation of the tissue along the resection line 17 and simultaneous cauterisation of the blood vessels along said resection line 17 whilst the needles 5, 5a are penetrating the tissue 16. The operation can be repeated along a second resection line 18 to completely insulate the metastasis 15 from the rest of the tissue 16. Finally, using a prior-art scalpel, or also only manually, the portion of tissue with the metastasis 15 is detached from the rest of the tissue 16, along the two resection lines 17, 18 along which the tissue 16 is necrotised and therefore easily separable from the surrounding tissue. There is furthermore no loss of blood because, as already mentioned, the blood vessels along the resection line were cauterised when the needles 5, 5a were inserted into the tissue 16.

In the version of the apparatus that is provided with hollow needle elements 5, 5a containing optic fibres, the described operations do not vary. In this case, necrotisation of the tissue 16 along the resection lines 17, 18 and simultaneous cauterisation of the blood vessels are caused by heating the tissue by means of the laser light transmitted via the optic fibres inserted into each hollow needle 5, 5a.

In the practical embodiment the materials, dimensions and the implemented details may be different from those described but be technically equivalent, and still fall within the legal scope of this invention.

CLAIMS

1. Apparatus for treating organic tissue (16) to be subjected to surgical resection, comprising a body (1) with which treatment means of said organic tissue (16) is associated (5; 5a), characterized in that said treatment means comprises a plurality of treating elements (5; 5a) arranged in an aligned configuration.

2. Apparatus according to claim 1, wherein each of said treating elements consists of a needle element (5, 5a), one end (14) of which may protrude from said body (1).

3. Apparatus according to claim 2, wherein said needle elements (5, 5a) are of essentially the same length.

4. Apparatus according to claim 2, wherein said needle elements (5, 5a) have lengths that vary from one other.

5. Apparatus according to claim 3, wherein said needle elements (5; 5a) are arranged in such a way that their tips (14) are substantially aligned along a line that is parallel to one side (23) of said body (1).

6. Apparatus according to claim 3, wherein said needle elements (5; 5a) are arranged in such a way that their tips (14) are substantially aligned along a straight line that is tilted in relation to one side (23) of said body (1).

7. Apparatus according to claim 4, wherein said needle elements (5; 5a) are arranged in such a way that their tips (14) are substantially aligned along a line that is parallel to one side (23) of said body (1).

8. Apparatus according to claim 4, wherein said needle elements (5; 5a) are arranged in such a way that their tips (14) are substantially aligned along a straight line that is tilted in relation to one side (23) of said body (1).

9. Apparatus according to claim 4, wherein said needle elements (5; 5a) are arranged in such a way that their tips (14) are substantially aligned along a curved line.

10. Apparatus according to any one of claims 2 to 9, wherein said needle elements are electro-needle elements (5, 5a) connected to respective electric-power supply means.

11. Apparatus according to claim 10, wherein said electric-power supply means supply said electrode-needles (5; 5a) with a radio frequency voltage.

12. Apparatus according to any one of claims 2 to 9, wherein each of said needle elements comprises a hollow needle (5; 5a) inside which a laser optic fibre is inserted.

13. Apparatus according to claim 12, wherein each of said laser optic fibres is supplied with a laser light by appropriate supply means .

14. Apparatus according to any one of claims 2 to 13, wherein each of said needle elements (5; 5a) is fixed in a removable manner to a support element (4; 4a).

15. Apparatus according to claim 14, wherein each of said needle elements (5; 5a) is fixed at its own end (6), opposite said end (14), to said support element (4; 4a).

16. Apparatus according to claim 15, wherein each of said needle elements (5; 5a) is fixed to said support element (4; 4a) by means of a Luer-lock fixing element.

17. Apparatus according to any one of claims 14 to 16, wherein said support element (4; 4a) is coupled with said body (1) in a sliding manner.

18. Apparatus according to claim 17, wherein said support element (4; 4a) is associated with sliding means (7) running along a guide means (8) fixed to said body (1).

19. Apparatus according to claim 18, wherein said sliding means (7) is associated with manoeuvring means (10, 11).

20. Apparatus according to claim 19, wherein said manoeuvring means (10) comprises the locking means (11) of said slide means (7).

21. Apparatus according to any one of claims 14 to 20, wherein said support element (4; 4a) is associated with an indicator means (19).

22. Apparatus according to claim 21, wherein said indicator means (19) emerges through a pair of slits (12) made in a front wall (2) of said body (1).

23. Apparatus according to claim 22, wherein at least one of said slits (12) is associated with a graded scale (20).

24. Apparatus according to claim 22, or 23, wherein said front wall (2) is connected to said body (1) in a removable manner.

25. Apparatus according to any one of claims 14 to 24, wherein said support element (4, 4a) has a substantially constant height.

26. Apparatus according to any one of claims 14 to 24, wherein said support element (4; 4a) has a height that varies in a substantially linear manner.

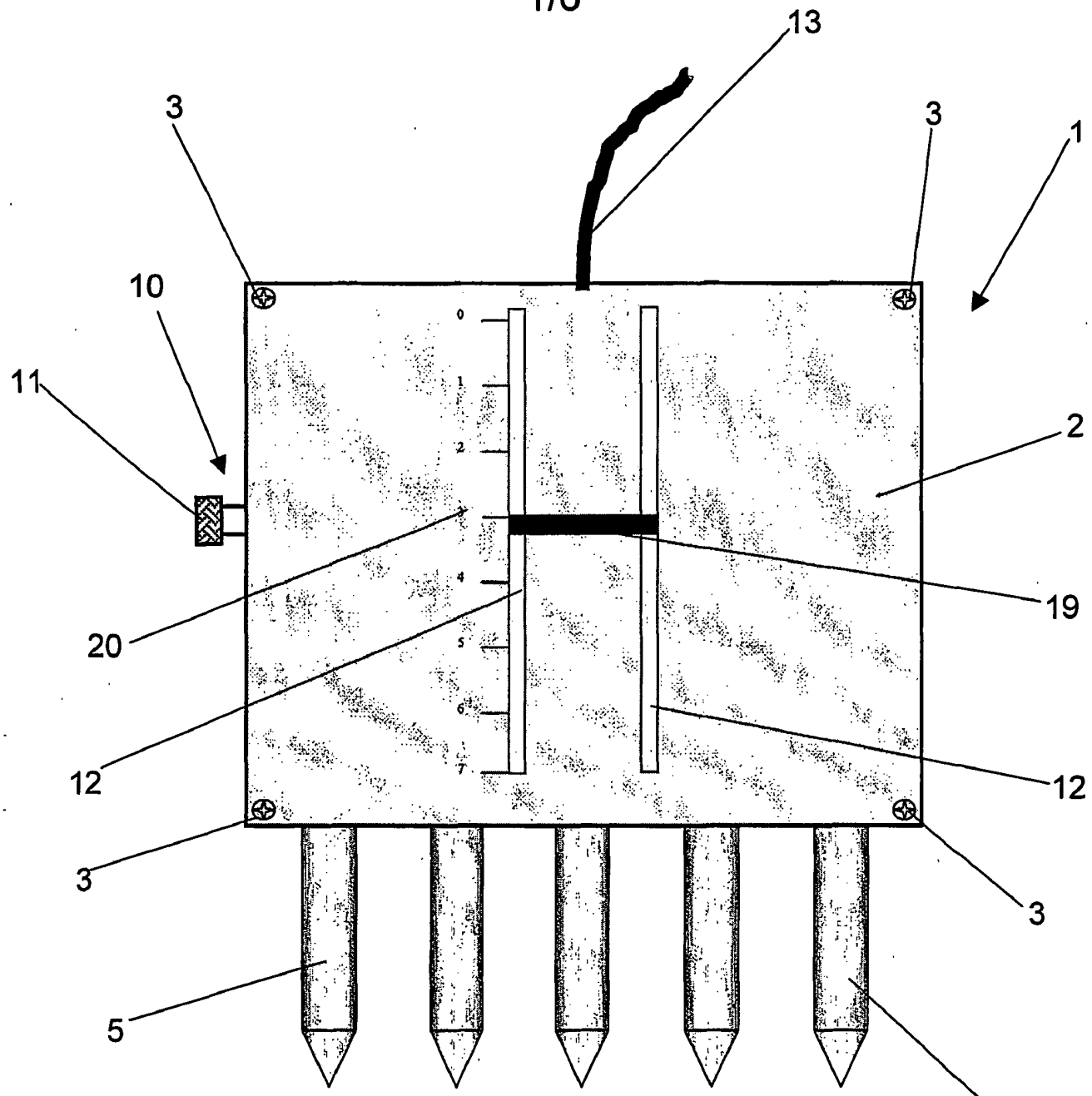

Fig. 1

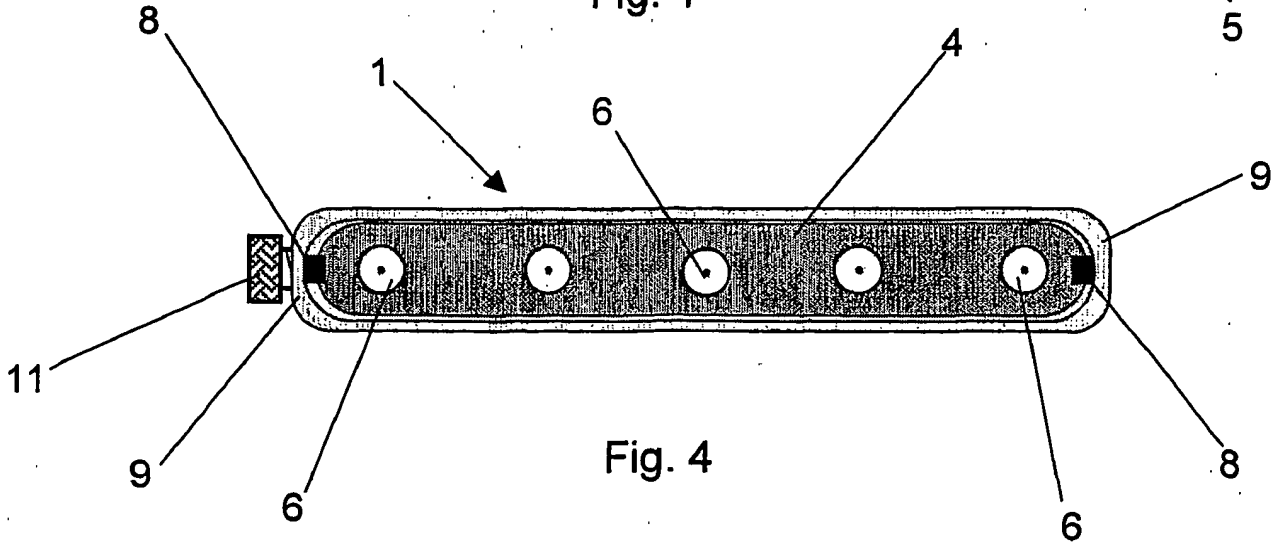

Fig. 4

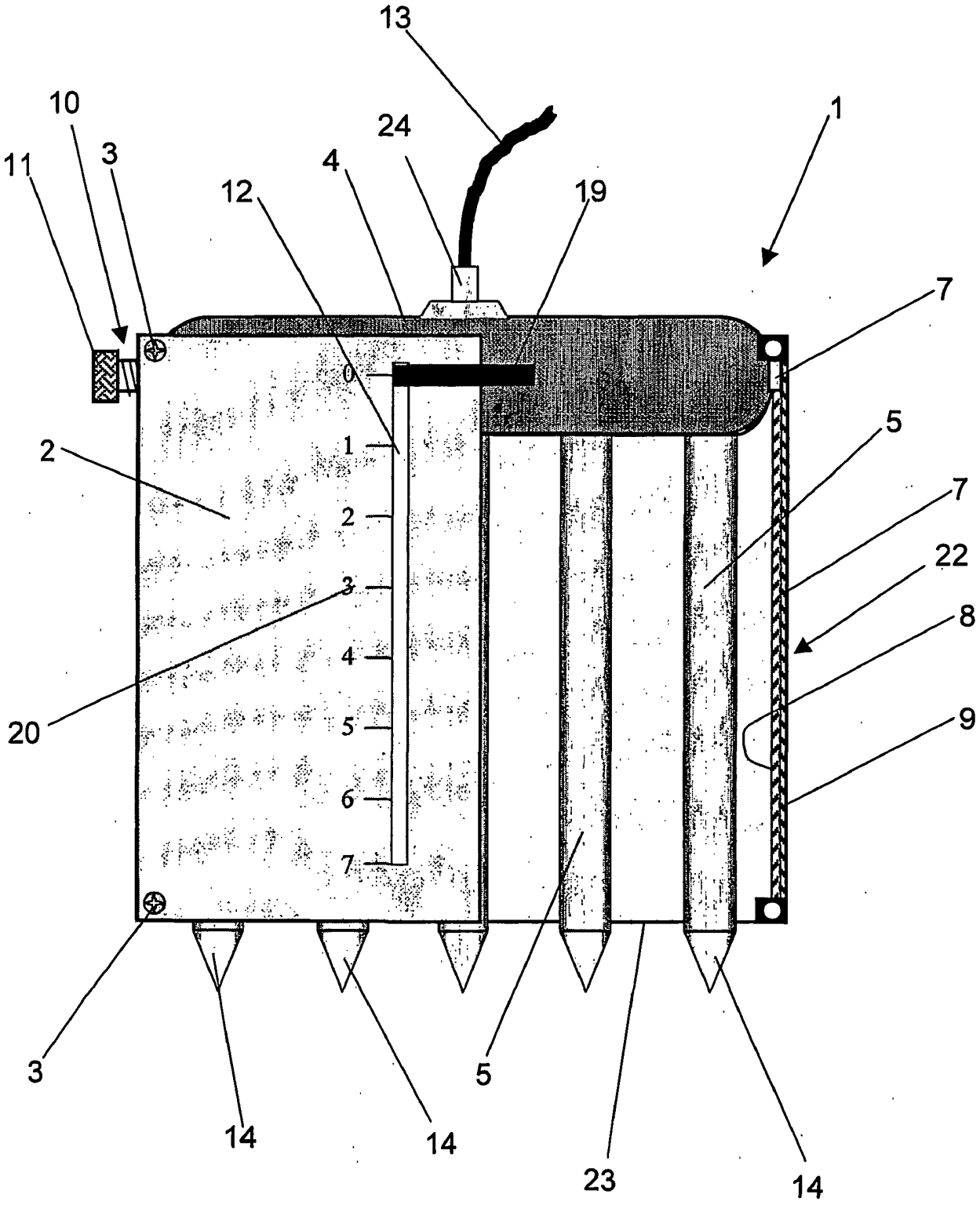

Fig. 2

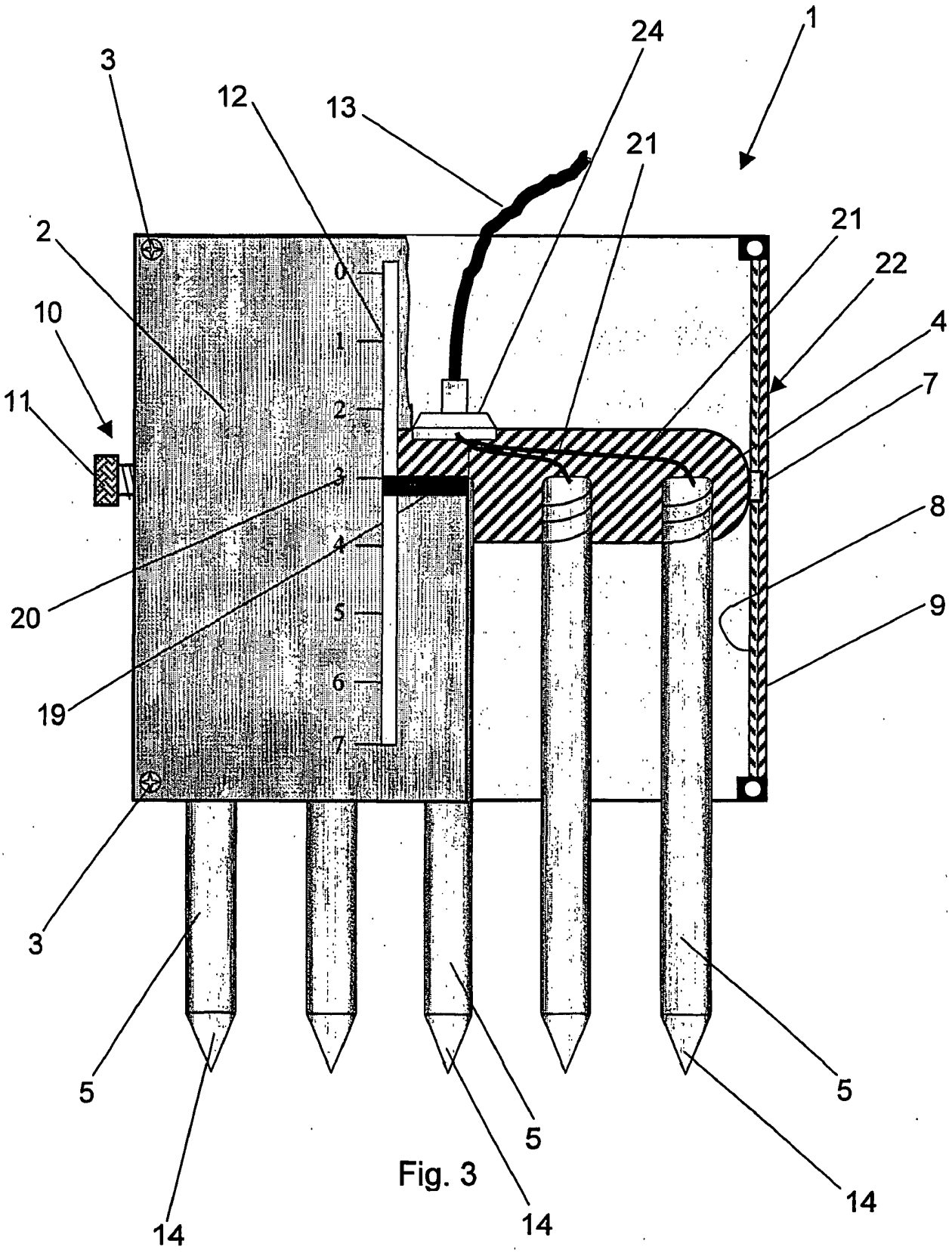

Fig. 3

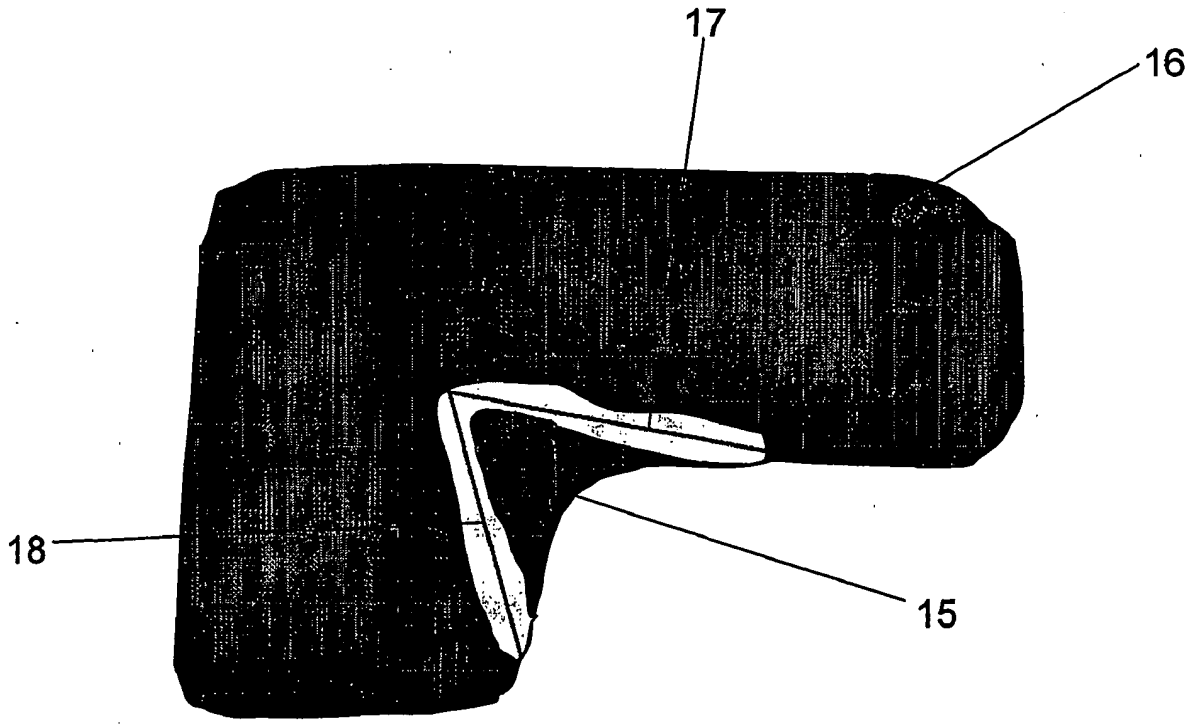

Fig. 5

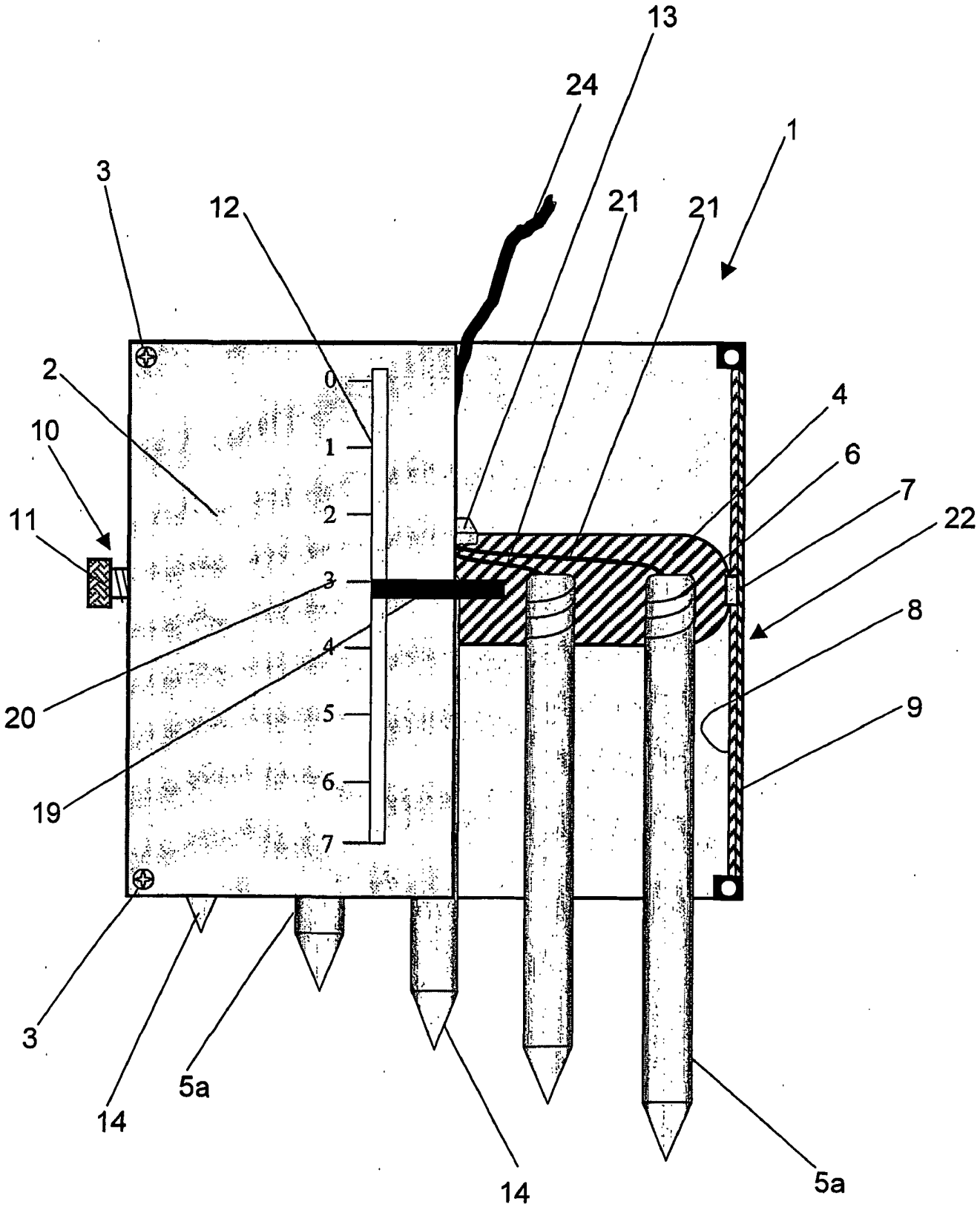

Fig. 6

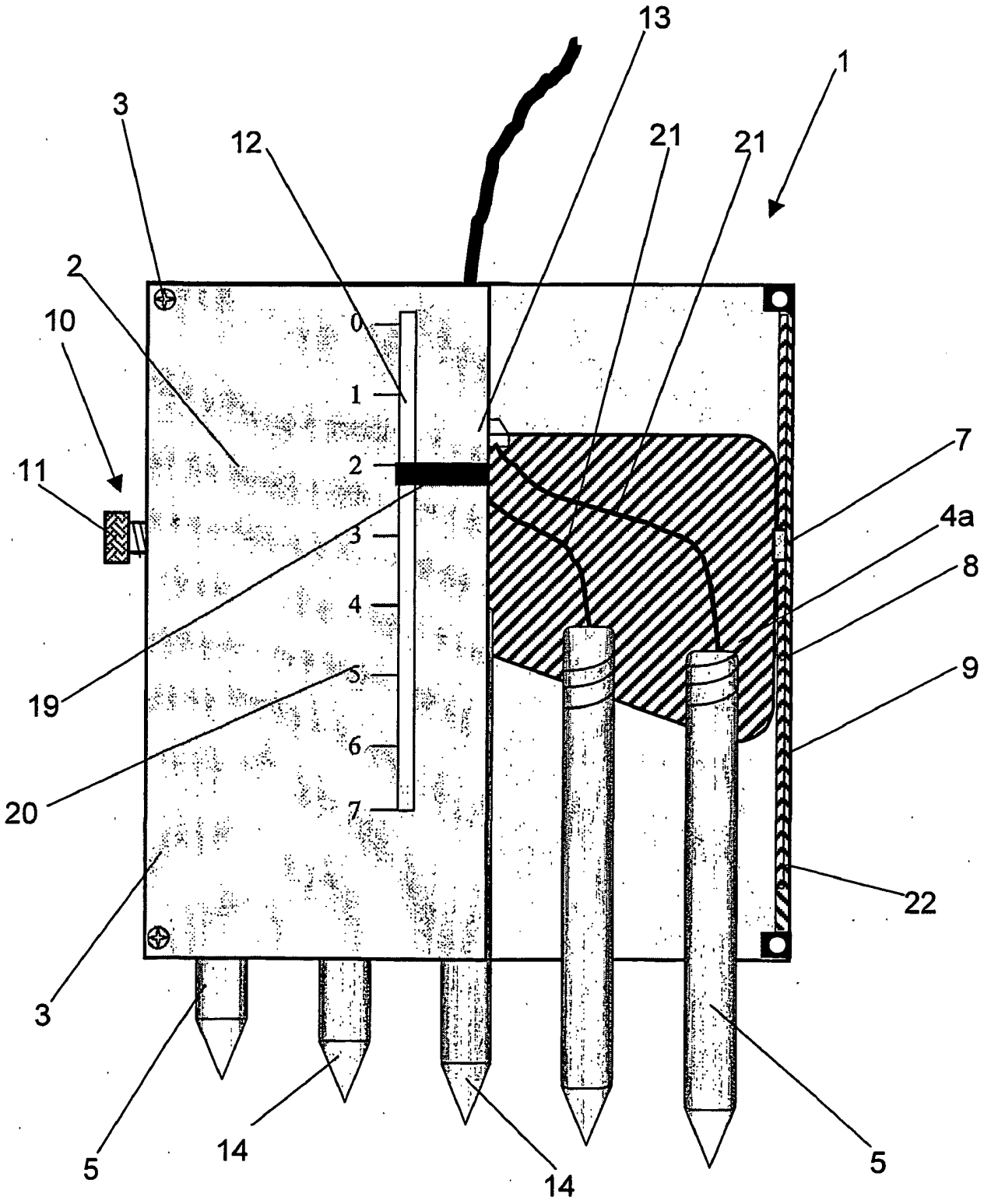

Fig. 7

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 A61B18/14

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 A61B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 99 04710 A (RITTMAN WILLIAM J III ;COSMAN ERIC R (US)) 4 February 1999 (1999-02-04)	1-11
Y	page 12, line 1 - line 11 page 16, line 21 -page 17, line 6 page 27, line 21 -page 29, line 23; figures 1,2B,7	14-26
X	US 6 077 257 A (MARCUS STEVEN ET AL) 20 June 2000 (2000-06-20) column 5, line 15 - line 26; figures 1,2,2A	1-11
X	US 6 126 657 A (LAX RONALD G ET AL) 3 October 2000 (2000-10-03) column 4, line 50 -column 5, line 40; figure 2	1-13

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[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
30 October 2002	07/11/2002

Name and mailing address of the ISA	Authorized officer
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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication,where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 97 36548 A (BAKER JAMES ;STRUL BRUNO (US); LAX RONALD G (US); EDWARDS STUART D) 9 October 1997 (1997-10-09) page 11, line 27 - line 29; figure 2	14-26
A	US 5 599 294 A (LUNDQUIST INGEMAR H ET AL) 4 February 1997 (1997-02-04) column 5, line 14 - line 17 column 10, line 56 - line 63; figure 13	12,13, 17-23

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9904710 A	04-02-1999	AU 752140 B2	05-09-2002
		AU 8512998 A	16-02-1999
		EP 0998235 A1	10-05-2000
		JP 2001510702 T	07-08-2001
		WO 9904710 A1	04-02-1999
		US 2002111615 A1	15-08-2002
US 6077257 A	20-06-2000	US 5921954 A	13-07-1999
		US 5738114 A	14-04-1998
		US 5836906 A	17-11-1998
		US 5718702 A	17-02-1998
		US 5743870 A	28-04-1998
		US 5743904 A	28-04-1998
		AU 735642 B2	12-07-2001
		AU 4646597 A	14-04-1998
		EP 0935444 A1	18-08-1999
		JP 2001500763 T	23-01-2001
		WO 9811834 A1	26-03-1998
		US 6419673 B1	16-07-2002
		AU 734542 B2	14-06-2001
		AU 3402297 A	02-02-1998
		EP 0925042 A1	30-06-1999
		JP 2002505591 T	19-02-2002
		WO 9801087 A1	15-01-1998
		AU 1968697 A	10-09-1997
		AU 3119597 A	26-11-1997
		AU 6850696 A	09-12-1997
		WO 9743969 A1	27-11-1997
		WO 9730645 A1	28-08-1997
		WO 9741789 A1	13-11-1997
		AU 2278297 A	10-09-1997
		AU 3077497 A	09-12-1997
		AU 3141397 A	09-12-1997
		AU 3145597 A	09-12-1997
		CA 2253847 A1	27-11-1997
		CN 1219885 A	16-06-1999
		EP 0959785 A1	01-12-1999
		EP 0901398 A1	17-03-1999
		JP 2000511087 T	29-08-2000
		JP 2000511089 T	29-08-2000
		JP 2000511092 T	29-08-2000
		WO 9730646 A1	28-08-1997
		WO 9744092 A1	27-11-1997
		WO 9743972 A1	27-11-1997
		WO 9743973 A1	27-11-1997
		US 5800379 A	01-09-1998
		US 5879349 A	09-03-1999
		US 5730719 A	24-03-1998
		US 5820580 A	13-10-1998
		US 6126657 A	03-10-2000
		AU 2070897 A	26-11-1997
		CA 2253705 A1	13-11-1997
		CN 1217639 A	26-05-1999
		EP 0904025 A2	31-03-1999
		JP 2000509619 T	02-08-2000
		KR 2000010815 A	25-02-2000
		WO 9741786 A2	13-11-1997

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 6126657 A	03-10-2000	US 5879349 A	09-03-1999
		US 5836906 A	17-11-1998
		US 5728094 A	17-03-1998
		US 5707349 A	13-01-1998
		AU 8570298 A	10-02-1999
		WO 9903412 A1	28-01-1999
		AU 3077497 A	09-12-1997
		AU 725853 B2	19-10-2000
		AU 6954896 A	26-11-1997
		CA 2252820 A1	13-11-1997
		EP 0914068 A2	12-05-1999
		EP 0959785 A1	01-12-1999
		JP 2000514319 T	31-10-2000
		JP 2000511089 T	29-08-2000
		KR 2000010722 A	25-02-2000
		WO 9741785 A2	13-11-1997
		WO 9743972 A1	27-11-1997
		AU 2278297 A	10-09-1997
		AU 3119597 A	26-11-1997
		AU 3141397 A	09-12-1997
		AU 3145597 A	09-12-1997
		AU 6850696 A	09-12-1997
		CA 2253847 A1	27-11-1997
		CN 1219885 A	16-06-1999
		EP 0901398 A1	17-03-1999
		JP 2000511087 T	29-08-2000
		JP 2000511092 T	29-08-2000
		WO 9743969 A1	27-11-1997
		WO 9730646 A1	28-08-1997
		WO 9741789 A1	13-11-1997
		WO 9744092 A1	27-11-1997
		WO 9743973 A1	27-11-1997
		US 6419673 B1	16-07-2002
		US 5743904 A	28-04-1998
		US 5800379 A	01-09-1998
		US 5730719 A	24-03-1998
		US 6077257 A	20-06-2000
		US 5820580 A	13-10-1998
		AU 1968697 A	10-09-1997
		AU 2135597 A	10-09-1997
		AU 702374 B2	18-02-1999
		AU 6851496 A	12-03-1997
		EP 0850023 A1	01-07-1998
		JP 11511054 T	28-09-1999
		WO 9706741 A2	27-02-1997
		WO 9730645 A1	28-08-1997
		WO 9730647 A1	28-08-1997
		US 5738114 A	14-04-1998
		AU 718288 B2	13-04-2000
		AU 6898896 A	10-09-1997
WO 9736548 A	09-10-1997	US 5935123 A	10-08-1999
		AU 1989397 A	22-10-1997
		WO 9736548 A1	09-10-1997
		US 2002035363 A1	21-03-2002
US 5599294 A	04-02-1997	AT 132046 T	15-01-1996
		AU 671405 B2	22-08-1996

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5599294 A		AU 2047595 A	10-08-1995
		AU 657235 B2	02-03-1995
		AU 4999893 A	15-03-1994
		BR 9306893 A	08-12-1998
		CA 2121032 A1	03-03-1994
		CA 2226484 A1	03-03-1994
		DE 4305663 A1	17-02-1994
		DE 69301143 D1	08-02-1996
		DE 69325164 D1	08-07-1999
		DE 69325164 T2	25-05-2000
		EP 0611314 A1	24-08-1994
		EP 0629382 A1	21-12-1994
		EP 0893101 A2	27-01-1999
		ES 2084510 T3	01-05-1996
		ES 2134295 T3	01-10-1999
		FI 950584 A	04-04-1995
		FR 2694700 A1	18-02-1994
		GB 2269538 A ,B	16-02-1994
		IL 104647 A	31-12-1995
		JP 7503645 T	20-04-1995
		JP 3128242 B2	29-01-2001
		KR 273015 B1	01-12-2000
		MX 9304905 A1	29-04-1994
		NZ 255687 A	20-12-1996
		US 5370675 A	06-12-1994
		US 2001031941 A1	18-10-2001
		US 5385544 A	31-01-1995
		US 5421819 A	06-06-1995
		US 6022334 A	08-02-2000
		US 5435805 A	25-07-1995
		US 6102886 A	15-08-2000
		WO 9404220 A1	03-03-1994
		US 6241702 B1	05-06-2001
		US 5409453 A	25-04-1995
		US 5470308 A	28-11-1995
		US 5366490 A	22-11-1994
		US 5556377 A	17-09-1996
		US 5720718 A	24-02-1998
		US 5542915 A	06-08-1996
		US 5470309 A	28-11-1995
		US 5554110 A	10-09-1996
		US 5549644 A	27-08-1996
		US 5484400 A	16-01-1996
		US 6206847 B1	27-03-2001
		US 6129726 A	10-10-2000
		US 5630794 A	20-05-1997
		US 5514131 A	07-05-1996